

Description

TRAILER LOADER/UNLOADER WITH PULLOUT SECTION

CROSS REFERENCE TO RELATED APPLICATIONS

[0001] This application claims priority from United States provisional patent application Ser. No. 60/320,211, filed on May 22, 2003, the disclosure of which is hereby incorporated herein by reference in its entirety.

BACKGROUND OF INVENTION

[0002] The present invention pertains to trailer loaders and/or unloaders and, in particular, to an extendable conveying system having a pullout section.

[0003] Extendable conveying systems are useful in assisting an operator to load and/or unload a trailer. They deliver the goods to, or remove the goods from, the location of the operator, thereby minimizing the amount of movement of the operator. Certain designs of a trailer loader/unloader utilize a pullout section. Such pullout section may provide an additional extension to the conveying system that is

manually extended or retracted by the operator. The pull-out section may be pitched at an angle and may be of significant length, such as 12 feet, thereby requiring significant force to retract the pullout section into the remaining portion of the system. Because the pullout section may be close to the floor of the trailer, the operator may be forced to stoop over while attempting to apply sufficient force to retract the pullout section thereby further decreasing ergonomic efficiency.

SUMMARY OF INVENTION

[0004] The present invention is directed to an extendable conveying system for either loading product to or unloading product from a trailer. The system includes an extendable section which defines a conveying surface. The system further includes a pullout section that defines a support surface. The pullout section has an extended position and a retracted position. When the pullout section is in its extended position, its support surface at least partially extends from the conveying surface. The system further includes an energy-storing device connected with the pullout section and the extendable section. The energy-storing device stores energy as the pullout section is moved from either the extended or retracted position to the other

of the extended or retracted positions. The energy storing device then delivers energy to the pull-out section as the pull-out section is moved from the other of the extended or retracted positions to the initial of the extended or retracted positions.

[0005] These and other objects, advantages and features of this invention will become apparent upon review of the following specification in conjunction with the drawings.

BRIEF DESCRIPTION OF DRAWINGS

[0006] Fig. 1 is a perspective view of an extendable conveying system, according to the invention;

[0007] Fig. 2 is a side elevation of a portion of the extendable conveying system in Fig. 1;

[0008] Fig. 3 is a sectional view taken along the lines III-III in Fig. 2;

[0009] Fig. 4 is a perspective view illustrating the matter in Fig. 3 within the extendable conveying system; and

[0010] Fig. 5 is a perspective view similar to that of Fig. 4 illustrating operation thereof.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

[0011] Referring now specifically to the drawings, and the illustrative embodiments depicted therein, an extendable con-

veyor system 10 includes an extendable section 12 which may be extended into a semi-trailer, or the like, such as by operation of motor driven wheels 14 and steerable wheels 16. Such an extendable conveying system is generally known in the art and is described in detail in commonly assigned United States Patent 4,425,069, the disclosure of which is hereby incorporated herein by reference. Extendable section 12 includes a conveying surface 18 which is capable of conveying product. In the illustrative embodiment, extendable conveying system 10 is illustrated as a trailer loader wherein product is conveyed in a general left-to-right direction, as viewed in Fig. 1. Conveying surface 18, in the illustrative embodiment, is a driven conveying surface having accumulation capabilities generally of the type disclosed in commonly assigned United States Patent 5,429,225, the disclosure of which is hereby incorporated herein by reference. It should be understood that conveying surface 18 may be a gravity-conveying surface which is not driven but, rather, product is propelled by the force of gravity. Alternatively, conveying surface 18 may be driven in an opposite direction, namely from right-to-left, as viewed in Fig. 1, whereby the extendable conveying system may be a trailer un-

loader. Also, although extendable section 12 is illustrated as supportable from a trailer floor by virtue of wheels 14, 16, the extendable conveyor system may be a cantilevered-supported nesting-type of extendable conveyor, such as disclosed in commonly assigned United States Patents 5,351,809; 5,423,413; 5,487,462; 6,006,893; and 6,484,862, the disclosures of which are hereby incorporated herein by reference in their entirety.

[0012] In the illustrative embodiment, conveying surface 18 includes a terminal portion 20 which, in the illustrative embodiment, is a gravity-conveying surface but may be other types of conveying surfaces. Extendable conveying system 10 includes a pull-out section 22 which has a retracted position in which it is nested within extendable section 12, as illustrated in Fig. 2. Pullout section 22 includes a support surface, such as a conveying surface 24 which extends from conveying surface 18 when pullout section 22 is extended. In the illustrated embodiment, support surface 24 is illustrated as a gravity-conveying surface but may also be a non-conveying surface which merely supports product discharged from conveying surface 18. As supporting a gravity-conveying surface in the illustrative embodiment, pullout section 22 is pitched at an angle

from horizontal, as illustrated in Fig. 2. Thus, as pullout section 22 is extended, it does so with the assistance of gravity. As pullout section 22 is retracted to the position illustrated in Fig. 2, the operator must do so against the force of gravity. This significantly adds to the effort required to retract the pullout section.

[0013] In order to overcome such deficiencies, an energy-storing device 26 is provided (Figs. 3–5). Energy-storing device 26 stores energy as pullout section 22 moves from the retracted position illustrated in Fig. 2 to an extended position. This is accomplished in the illustrative embodiment by a spring 28 which has a constant force throughout its length of travel as the pullout section is extended. In the illustrative embodiment, that constant force is applied throughout 12 feet of travel. However, it should be understood that the length of travel may vary depending upon the application. Such a constant force may be obtained by a clock spring device, which is also known in the art as a negator spring. Such devices are commercially available. The spring is fixedly attached to a side channel 30 of extendable section 12 and receives therein a roller 32 which extends to an opposite side channel 34. A pair of straps 36 are interconnected with a portion of pullout section 22.

Straps 36 wrap around shaft 32 and are held in place by collars 38.

[0014] In operation, as pullout section 22 is extended, straps 36 unwind from roller 32. In the process, spring 28 is wound thereby storing energy. As the pullout section is retracted to the position illustrated in Fig. 2, the energy stored in the spring is released thereby assisting the operator in retracting the pullout section against the force of gravity and/or friction. In the illustrative embodiment, a total of 30 pounds of spring force are utilized. However, this amount is dependent upon the application. Also, although the invention is illustrated with a clock spring, other types of springs may be utilized, such as various forms of torsion springs, expansion springs, compression springs, and the like. Also, various forms of weight systems may be utilized. Suitable interconnections adapt the invention to those different embodiments.

[0015] Changes and modifications in the specifically described embodiments can be carried out without departing from the principles of the invention which is intended to be limited only by the scope of the appended claims, as interpreted according to the principles of patent law including the doctrine of equivalents.